We believe that those qualified to give an opinion will agree as to the tendency of papers like these. They are direct incentives to learning propositions by rote—a practice to which beginners are by nature only too prone, without being encouraged by the grave authority of an ancient University: and they tend to paralyse any efforts a tutor may make to teach his subject intelligently. How is he to get pupils to listen to any discussion of difficulties, or to care for any deductions from the propositions, when they know as well as he does that not a mark can be gained by anything which goes beyond a bare knowledge of the Simsonian text?

Well might the Council of the Association for the Improvement of Geometrical Teaching, in its last Report, "regret to notice that the Euclid papers set for Responsions at Oxford still consist exclusively of bookwork," and remark that "the entire absence of riders or other questions designed to test the real knowledge of the student seems calculated to foster 'cram.'" The Council confined itself, as we have done, to the "Responsions" papers, but its remarks apply with equal force to "Moderations." The Euclid paper in the "First Public" and "Second Public" of Michaelmas 1889 are, in effect:—

"Write out IV. 1, III. 10, 3rd case of III. 35, III. 2, III. 25, III. 28, III. 12, III. 17, IV. 4, IV. 7.

"Define plane superficies, rhomboid, sector, similar segments, ratio, ex æquali.

"Write out the three postulates and the twelfth axiom.

"Write out I. 7, I. 29, I. 48, II. 12, III. 15, III. 26, IV. 6, VI. 5, VI. 18."

Though we regret the absence of "riders," we do not attach so much importance to it as to that of "other" questions arising naturally from the definitions, axioms, postulates, and propositions set to be written out: questions, for instance, on the redundancy of the definitions; on the distinction between the general and the geometrical axioms; on the axioms tacitly assumed by Euclid; on the truth or falsehood of the converse of a given proposition; on the interdependence of two contrapositives; or on the difficulties of Euclid's treatment of parallels.

It is instructive to contrast the Mathematical Responsions papers with those set in the classical part of the same examination. In these the University is by no means satisfied, as in the mathematical, with a knowledge which may be obtained by efforts of the memory alone, but applies the sharp test of prose composition and "unseens." To this inequality we draw the special attention of readers of NATURE. Compare the course open to a classical man with that which lies before one who intends to take his degree in science or mathematics. The classical man appears to have everything in his favour: he most likely knows enough mathematics to feel quite comfortable as to the paltry modicum required at Responsions. The other is in a very different position. If he has attained to anything like scholarship in his own subject, it will only be in rare cases that he can hope to get through Responsions without devoting a large amount of valuable time towards the acquirement of some facility in prose composition. We should like to see a vigorous protest by the science graduates against this anomaly.

PRZEWALSKY'S ZOOLOGICAL DISCOVERIES.[1]

WITH great satisfaction naturalists will observe that a complete account of Przewalsky's zoological observations and discoveries is to be given to the world, and has in fact been for some time in course of publication. The great Russian explorer, although perhaps best known in Western Europe as a geographical traveller, was at heart a naturalist, and one of no mean rank. Those who have read the narratives of his four great journeys will recollect how full they are of notes on the animals and plants met with during his routes. The specimens obtained by him and his companions were carefully preserved, and deposited in the Museum of the Imperial Academy of Sciences at St. Petersburg. Up to the present time these collections have only been made known to the public by various fragmentary accounts of them in scientific journals, and in the appendices to Przewalsky's volumes of travels, which were in many cases of the most unsatisfactory character. The Imperial Crown Prince Nicolas of Russia has now, however, placed at the disposal of the Imperial Academy, in whose Museum Przewalsky's collections are stored, a sum sufficient to cover the cost of the publication of a connected account of them. To no more worthy object could Royalty devote its income, and the resulting volumes promise to be alike a credit to the great nation to which Przewalsky belonged, and to form a very material contribution to zoological science.

As is almost the universal and necessary custom nowadays, the different branches of the collections to be investigated have been placed in the hands of different specialists. The mammals had been undertaken by Eugene Büchner, the Conservator of the Division of Mammals in the Academy's Zoological Museum. Herr Theodor Pleske, who has lately succeeded Herr Russow in the charge of the birds of the same Museum, supplies the portion of the work relating to the objects under his care. Similarly, to Herr S. Herzenstein have been assigned the fishes. Each section is prepared on a similar plan. The text is given in parallel columns of Russian and German. We cannot complain of a great national work like the present being published primarily in the national language, but our thanks should be given to the learned Academy for letting us have it also in a tongue generally understood by scientific men. The work is well illustrated, and the plates are excellently drawn, those of the mammals and birds mostly by Mützel, the well-known German lithographic artist. Up to the present time we have seen three parts of the mammals, one of the birds, and two of the fishes of this important work, which is a credit alike to the Academy which has produced it, and to the distinguished personage who has supplied the necessary means.

NOTES.

THE Chemical Society will this year for the first time hold its anniversary meeting (March 27) in the afternoon at 4 p.m., and the Fellows and their friends will dine together in the evening at the Whitehall Rooms, Hotel Métropole. It is hoped that the Fellows will signify their approval of this alteration by attending in considerable numbers.

A MEETING was held in Berlin on Monday, March 10, under the auspices of the German Chemical Society, to celebrate the 25th anniversary of the promulgation of Prof. Kekulé's theory of the constitution of the aromatic compounds. A very large number of chemists assembled in the Rathhaus in the afternoon. After an introductory address by the President, Prof. v. Hofmann, Prof. A. Bayer delivered a lecture in which he pointed out how completely modern investigations had confirmed Kekulé's views. A congratulatory address from the German Chemical Society was then presented to Prof. Kekulé. Prof. Armstrong attended on behalf of the London Chemical Society, Prof. Korner on behalf of the Italian chemists, Prof. Bischof on behalf of the Russian chemists; and besides the addresses presented by those representatives, there were very numerous letters and telegrams of congratulation from various sources. Dr. Glover, on behalf of German artificial dye-stuff manufacturers, then presented a most admirable portrait of Prof. Kekulé which had been painted by the celebrated painter Angeli; this is to be placed in the Berlin galleries. Prof. Kekulé returned thanks in an eloquent address. Subsequently a banquet was held which was very numerously attended.

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[1] "Wissenschaftliche Resultate der von N. M. Przewalski nach Central-Asien unternommenen Reisen: auf Kosten einer von seiner Kaiserlichen Hoheit dem Grossfürsten Thronfolger Nikolai Alexandrowitsch gespendeten Summe." Herausgegeben von der Kaiserlichen Akademie der Wissenschaften. Zoologischer Theil. (St. Petersburg, 1888-89.)

LORD RAYLEIGH has been elected a correspondent of the Paris Academy of Sciences in the department of physics.

THE discourse to be given by Lord Rayleigh at the Royal Institution on Friday evening, March 28, will be on "Foam."

MR. H. CARRINGTON BOLTON, the eminent American bibliographer, wishes to associate himself with those who recommend the system of Russian transliteration, explained lately in NATURE (p. 397). His letter was not received in time to permit of his name being included in the list of signatures.

THE visit of the Iron and Steel Institute to America is likely to be remarkably successful. At a meeting held the other day at New York, upon the invitation of Mr. Andrew Carnegie, a committee was appointed to arrange a reception for the members. The Philadelphia Correspondent of the *Times* says so many invitations have been received from various parts of the country that the belief is that the month given to the visit will be insufficient. The members will meet in New York. There will also be an international session at Pittsburg.

A STATED meeting of the Royal Irish Academy was held in Dublin on the 15th inst., at which the President and Council for the ensuing year were elected. Prof. Sollas, F.R.S., read a paper on the mica which occurs in well-formed crystals in the famous geodes of the Mourne Mountain granite: it was described as a lithium mica of the species Zinnwaldite. Most of the crystals possessed an exquisitely defined zonal structure, and in a single crystal a change in colour, density, composition, and in the magnitude of the angle of the optic axes could be traced on passing from the centre to the surface; this gradual transition from a more ferro-magnesian character near the centre to a more alumino-alkaline one near the surface was compared to the change from a more anorthite-like to a more albitic character, which accompanies the growth of many zonal felspars. This subject is also referred to in Prof. Sollas's paper on the granites of Leinster, which is to appear in the Academy's Transactions. The Report of the Council, giving the details of work done by the Academy during the past year, with notices of deceased members—among these John Ball, F.R.S., Sir Robert Kane, F.R.S., and Robert McDonnell, F.R.S.,—was read and adopted. Dr. E. Perceval Wright, Secretary to the Academy, was elected, in the place of the late Sir R. Kane, a visitor to the Museum of Science and Art, Dublin.

THE Royal Society of Medical and Natural Sciences of Brussels offers a gold medal of the value of 200 francs for the best essay on the influence of temperature on the progress, duration, and frequency of karyokinesis in an example belonging to the vegetable kingdom. The essay must be written in French, and must be sent in before July 1 to Dr. Stienon, 5 Rue du Luxembourg, Brussels.

MR. J. WERTHEIMER, head master of the Leeds School of Science and Technology, has been elected to the head mastership of the Merchant Venturers' School, Bristol, the largest technical school in the West of England.

RECOGNIZING the difficulty experienced by Western naturalists in following the valuable scientific work now carried on in Russia, a number of influential men of science of that country have arranged for the publication of a monthly review—the *Vyestnīk Estestvoznaniya.* This will consist of original articles and short reports, with French *résumés*, and an index, in French, to Russian periodical scientific literature; the subjects included will be zoology, botany, physiology, geology, and microscopical technology, with the allied sciences. As, with the exception of Nīkītīn's admirable geological bibliography, no adequate attempt has been made to record Russian general scientific literature, this review will supply a very general want. The facts that it is published under the auspices of the St. Petersburg Society of Naturalists, and that the list of promised contributors includes most of the leading Russian naturalists, are sufficient guarantee for its value. The bibliographical index commences in the second number. The first consists of eight original articles. W. Wagner treats of the Infusoria of the body-cavity of Sipunculus and Phascolosoma; J. Wagner of some points in the development of Schizopods; Schīmkevīch of the alternation of generation in the Hydromedusæ; Borodīn and Tanfīl'ev contribute botanical articles, the former discussing the nature and distribution of dulcite, and the latter the causes of the extinction of *Trapa natans.* Geology is represented by an account of the Devonian rocks of Mughodzhares, a criticism of Lévy's classification of the eruptive rocks by Polyenov, and an interesting account of the formulæ and relations of the different chemical types of the eruptive rocks by F. Levīnson-Lessīng. The subscription to the review, it may be added, is 3 roubles 50 kopecks, and the office of publication, the Society of Naturalists, St. Petersburg University.

THE Vienna correspondent of the *Standard* telegraphed as follows on Monday:—"Dr. Eder, Professor of the Photographic Institute of Vienna, has announced that a photographer named Verescz, living in Klausenburg, Transylvania, has succeeded in solving the problem of photographing in natural colours. Up to the present, only the shades between deep red and orange can be retained, and even these, if exposed to the light, fade in from two to three days; but the experiments are being continued, with good prospects of complete success."

RECENTLY Lord Reay, the Governor of Bombay, laid the foundation-stone at Poona of a Bacteriological Laboratory, which is to be annexed to the College of Science in that town. Dr. Cooke, the Principal of the College, to whose efforts the establishment of the Laboratory is due, stated that it was originally intended that the study of the diseases of the lower animals in Poona should be directed to check the losses from anthrax in cattle by the introduction into India of protective inoculation. With this object two Bengal students at the Cirencester Agricultural College underwent a course of study at M. Pasteur's laboratory in Paris. One of these gentlemen devoted his attention entirely to sericulture, the other studied M. Pasteur's system of vaccination against anthrax. He returned to India, and has since conducted some experiments on cattle in Calcutta. Subsequently, Mr. Cooper, of the Veterinary Service, was deputed to M. Pasteur's Institute for instruction in the system of inoculation against anthrax. While in Paris, Mr. Cooper submitted a report, and explained that for the work in question a special laboratory would be required. At the same time he advocated the adoption of artificial gas for the culture-stoves and glass-blowing, and for the purpose of obtaining the high temperature required for sterilizing vessels, instruments, &c. Subsequent inquiry showed that anthrax is not the only contagious disease of a fatal nature with which the Indian cattle-owner has to contend. He has also to take into account rinderpest, tuberculosis, pleuro-pneumonia, and, in a minor degree, foot and mouth disease. It was, therefore, evident that if an institution was established for the preparation of an anthrax vaccine its value would be greatly enhanced if diseases other than anthrax could receive attention. The main objects of the Poona

Laboratory therefore are:—(*a*) The preparation of anthrax vaccine for despatch to districts where anthrax prevails. (*b*) The conduct of experiments in rinderpest with a view to the discovery of the pathogenic micro-organism of the malady, its cultivation in broth and other media, and attenuation, so as to provide a vaccine that shall give immunity to animals in rinderpest-infected districts. (*c*) Experimental research into the epizootic diseases generally of the ox and horse. (*d*) The instruction of trained native veterinarians in a proper method of performing vaccination and of the precautions necessary to avoid risk of septic infection.

On March 17, at six minutes past 11, a severe shock of earthquake was felt at Bonn, and reports from the surrounding districts on the following morning showed that it was very generally perceived in the vicinity of the town. On March 18, in the morning, a strong shock of earthquake was felt at Malaga and the neighbouring towns. The inhabitants were greatly alarmed, but no damage is reported.

According to a telegram sent from New York by Reuter's Agency on March 15, the captain of the steamer *Slavonia* reported having encountered a waterspout during the voyage from Europe. The vessel sustained no damage.

The Pilot Chart of the North Atlantic Ocean for the month of March states that the weather during February was much more moderate than during the two preceding months. An area of very high barometer extended over nearly the entire length of the Transatlantic steamship routes during the first five days. After this date the pressure fell, and gales of varying force were experienced from time to time. The most important of these storms was one south of Newfoundland on the 21st, whence it moved rapidly eastward. The storm on the 11th in about lat. 49° 30′ N., long. 22° W., was also of considerable energy. The most extensive fog bank reported during the month occurred on the coast from the 24th to the 26th, from Boston to Norfolk. The unprecedentedly large amount of ice this season has been the cause of considerable delay and damage to vessels; there are not only vast fields of ice, but also a very large number of bergs, some of which are of enormous dimensions. The importance of the knowledge of ice movements to navigation is recognized to be so great, that the Navy Department has, at the request of the U.S. Hydrographer, despatched an officer to Halifax and St. John's to collect information upon the ice movements during this season and past years, for the purpose of facilitating predictions of the general movements in future. A petition is also being drawn up for transmission to the Canadian Government to take such steps as they may deem advisable to obtain as thorough a knowledge as possible of the currents in the Gulf of St. Lawrence and adjacent waters, on account of their dangerous character during thick weather.

In the summary of a meteorological journal kept by Mr. C. L. Prince, at his observatory, Crowborough, Sussex, during 1889, he draws attention to the great preponderance of north-east wind over all other wind currents, and more particularly over that from the south-west, which has obtained during the last five years. He has examined his registers for the thirty-one years ending with 1889, and finds that between 1859 and 1883 there were only two years, viz. 1864 and 1870, in which the north-east wind has been in excess. In 1884 the north-east and south-west winds were nearly balanced, but during the last five years the average frequency has been north-east 102, south-west 72. Comparative observations would be interesting with the view of seeing whether this reversal of the ordinary conditions holds good for other stations. The Greenwich observations show that this great preponderance of north-east wind is not borne out there, at all events in all of the years mentioned.

Technical instruction, according to the *Times of India*, now takes a leading place in the educational programme of the Central Provinces. A year ago an entirely new curriculum was devised, whereby, among other changes, agricultural and engineering classes were established at Nagpore; the scholarship rules were revised with special reference to technical education; drawing-masters were appointed at a large number of schools, and every encouragement was given to the study of that subject; and new subjects of a technical and scientific character were grafted on to old school programmes. When the fact is taken into consideration that the year was one of transition, the progress made may be pronounced most satisfactory. Eleven students out of thirty who applied were admitted into the engineering class after a test as to general education. These did well, and most of them have entered on a second year's course. The agricultural class had an average strength of twenty-five throughout the year, the pupils working on the model farm and in the laboratory established in connection with this technical education scheme. No fewer than seventeen of the lads came through the ordeal of a strict examination at the end of the session. When it is remembered how largely the economic future of India will depend on the development of her agricultural resources, the value of this work, now fairly initiated in the Central Provinces, cannot be over-estimated.

In the current number of the *American Naturalist* Mr. R. E. C. Stearns continues his interesting series of papers on the effects of musical sounds on animals. One of his correspondents writes:—"Some time since I had an ordinary tortoise-shell cat, which had a peculiar fondness for the tune known as 'Rode's Air.' One day I chanced to whistle it, when, without any previous training, she jumped on my shoulder, and showed unmistakable signs of pleasure by rubbing her head against mine, and trying to get as near my mouth as possible. I have tried many other tunes, but with no avail." Captain Noble, of Forest Lodge, Maresfield, England, testifies that he formerly had a cat which displayed a corresponding sensitiveness, but it was only by plaintive tunes that she was affected. When such an air was whistled, she would climb up, and try to get her mouth as close as possible to that of the whistler. "I used as a rule," says Captain Noble, "to whistle the 'Last Rose of Summer,' when I wished her to perform. I never could satisfy myself as to her motive in putting her mouth to mine. The most feasible conjecture that I was able to make seemed to be that she imagined me to be in pain, and in some way tried either to soothe me, or to stop my whistling."

A paper on forestry in India and the colonies was read last week by Dr. W. Schlich before the Royal Colonial Institute. He said that for 700 years a gradual destruction of the forests of India had gone on. Under British rule the process had been hastened by the extension of cultivated and pasture land, and by the laying down of railways. After a time difficulty was experienced in meeting demands for timber, and in the early part of the century a timber agency was established on the west coast, while, in 1873, a teak plantation on a large scale was made at Nilambur. Through the energy of a few officials the matter was kept before the public, and in 1882 the Forests Department of Madras was entirely reorganized. Several Acts were passed to provide for the management of the forests under the protection of the State, and a competent staff of officers was provided, to be reinforced from time to time by those educated at Cooper's Hill College. Under the charge of the Department were some 55,000,000 acres of forest lands, and the figures relating to the cost of the work done were very satisfactory. Dr. Schlich then gave an account of the action of the Australian colonies with regard to the regulation of wooded lands by the State, contending that in no case had sufficient steps been taken to ensure a lasting and continuous supply of timber.

We print to-day a review of Dr. Sydney J. Hickson's valuable work, "A Naturalist in North Celebes." It may be well at the same time to call attention to an "Album" which has been sent to us, containing reproductions of photographs taken in Celebes. The collection has been formed by Dr. A. B. Meyer, director of the Zoological and Ethnographical Museum of Dresden, and includes 37 plates, on which about 250 reproductions are printed. In 1870 and 1871 Dr. Meyer spent some time in Celebes, and the greater number of the photographs which have been reproduced he brought back with him. Others he has received from friends. We cannot say that the process employed has always yielded perfectly satisfactory results; nevertheless, the "Album" contains many representations that cannot fail to interest students of anthropology and ethnography. There are groups of portraits from northern, central, and southern Celebes, and any one who carefully studies them will find that they give him a very vivid idea of the various types of the native population. The tables are accompanied by short explanatory notices, some of the best of which are by Dr. J. G. F. Riedel, Utrecht. The work is edited by Dr. Meyer, and issued by Messrs. Stengel and Markert, Dresden.

Messrs. Macmillan and Co. have published a second edition of Sir John Lubbock's well-known "Scientific Lectures." The author includes in this edition the Presidential address read by him before the Institute of Bankers in 1879. The address contains many interesting suggestions as to the development of coinage, and is illustrated by two excellent plates representing ancient coins.

We have received the fifth volume of "Blackie's Modern Cyclopædia," edited by Dr. Charles Annandale. The volume includes words from "Image" to "Momus," and the articles, so far as we have tested them, are, like those of the preceding volumes, concise and accurate.

The Literary and Philosophical Society of Liverpool has published Nos. 41, 42, and 43 of its Proceedings. Among the papers printed, we may note "Life and Writings of the Hon. Robert Boyle," by Mr. E. C. Davies; "An Ideal Natural History Museum," by Prof. Herdman; "On the Remains of Temperate and Sub-Tropical Plants found in Arctic Rocks," by the Rev. H. H. Higgins: "Notes on the Cooke Collection of British Lepidoptera," by Mr. J. W. Ellis; "Lake Lahontan, an Extinct Quaternary Lake of North-West Nevada, U.S.A.," by Mr. R. McLintock; "On the Individuality of Atoms and Molecules," by the Rev. H. H. Higgins; note on the foregoing, by Prof. Oliver J. Lodge; "The Complete Analysis of Four Autopolar 10-Edra," by the Rev. T. P. Kirkman; and "On the Cradle of the Aryans," by Principal Rendall.

Mr. Fletcher, the well-known manufacturer of gas appliances, has just issued a little work of 70 pages on "Coal Gas as a Fuel" (Warrington: Mackie and Co.). Perhaps no one has given more attention to the subject than Mr. Fletcher, and his book is therefore of considerable importance. He gives an account of the precautions necessary to obtain the greatest efficiency in every case where coal gas can be applied—in the kitchen, bath-room, greenhouse, workshop, and laboratory. There is a useful chapter giving instructions to fitters with respect to flues and dimensions of service pipes. All who consume gas for purposes other than ordinary house illumination, will do well to read Mr. Fletcher's book.

A curious observation relating to influenza is quoted in *La Nature* from a Copenhagen journal. At the Royal Institution for education of deaf-mutes there, the pupils (about 70 boys and girls) have for seven years been regularly weighed every day in groups of 15 and under. This new experiment has yielded some interesting results. Thus it has been found that the children's growth in weight has occurred chiefly in autumn and in the first part of December; there is hardly any in the rest of winter and in March and April, and a diminution then occurs till the end of summer. Last year proved an exception. The curves of weight were quite like those of previous years till November 23. In the four weeks thereafter, while each child has usually gained on an average over 500 grammes, the girls last year gained nothing, and the boys only 200 grammes each (less than two-fifths of the normal amount). The contrast with 1888 was even more remarkable, 700 grammes having been the average four-weeks' gain in that year. There was no modification as regards food or other material conditions. Now, the influenza epidemic appeared in Copenhagen towards the end of November. While six of the professors at this institution were attacked, there were no pronounced cases among the pupils; but it is supposed that germs of the disease having entered the place, the struggle with these on the part of the children absorbed so much vital force that the organs of nutrition failed to give the normal increase of weight after November 23.

A remarkable fall of a miner down 100 metres of shaft (say 333 feet) without being killed, is recorded by M. Reumeaux in the *Bulletin de l'Industrie Minérale*. Working with his brother in a gallery which issued on the shaft, he forgot the direction in which he was pushing a truck, so it went over and he after it, falling into some mud with about 3 inches of water. He seems neither to have struck any of the wood *débris*, nor the sides of the shaft, and he showed no contusions when he was helped out by his brother after about ten minutes. He could not, however, recall any of his impressions during the fall. The velocity on reaching the bottom would be about 140 feet, and time of fall 4·12 seconds; but it is thought he must have taken longer. It appears strange that he should have escaped simple suffocation and loss of consciousness during a time sufficient for the water to have drowned him.

An extremely useful piece of apparatus has been devised by Prof. Lunge, and is described in the current number of the *Berichte*, by use of which all the troublesome reductions to standard temperature and pressure in the measurement of gas volumes may be avoided, the volume being actually read off corrected to 0° C. and 760 mm. pressure. The arrangement is at once simple and capable of adaptation to any form of gas apparatus. It consists essentially of three glass tubes, A, B, and C, arranged parallel to each other vertically, and all connected with each other below by means of a glass T tube and stout caoutchouc tubing. A is the measuring vessel, graduated in cubic centimetres; any gas measuring vessel, such as that of a nitrometer, or of a Hempel or other gas analysis apparatus, may be used for this purpose. It is closed at the top by the usual well-fitting stopcock, through which the gas to be measured is introduced in the ordinary manner. Below, the gas is enclosed by mercury which is poured down the tube C; Prof. Lunge terms this latter the pressure tube. The pressure tube is simply an ordinary straight glass tube of similar diameter and length to the measuring tube A, and open at the top. The tube B, called the reduction tube, is of about the same length, but of somewhat greater diameter in its upper half. This cylindrical expansion narrows again at the top, and terminates with a well-greased stopcock. A is firmly clamped to the stand, while B and C are held in spring clamps which permit of ready lowering or raising. The reduction tube B is then prepared as a reference tube, once for all, in the following manner. The stopcocks of A and B are opened, and mercury is poured down C until it rises nearly to the expanded portion of B. A drop of water is then introduced into B so that the enclosed air is saturated with aqueous vapour. The thermometer and barometer are next observed, and the apparent volume calculated of 100 c.c. of gas at 0° and 760 mm. A mark is then made upon the reduction tube B so that the volume of the tube between this mark and the stopcock is the calculated apparent volume of the standard 100 c.c. The size of the tube is so arranged that this mark falls on the narrower portion of the tube, just below the expanded part. The pressure tube C is then raised or lowered until the mercury in B stands at the mark, when the stopcock at the top of B is closed. Thus a volume of air is enclosed which at 0° and 760 mm. and in the dry state would occupy exactly 100 c.c. In order to determine the corrected volume of a gas it is then only necessary to introduce it into the measuring tube A, allow it to cool to the temperature of the room, and then adjust B until the mark is a little higher than the mercury meniscus in A; C is next raised until the mercury in B rises to the mark, when B and C are finally simultaneously lowered until the level of the mercury in A and B is the same. The gas in A and the air in B are evidently equally compressed, and thus the volume read off upon the measuring tube A represents the corrected volume at 0° and 760 mm. The simplicity of the arrangement and the rapidity with which it can be worked are sure to recommend it for general use; and its applicability to the estimation of nitrogen in organic substances, which Prof. Lunge discusses in detail, will doubtless be especially appreciated by those who employ the volumetric method.

THE additions to the Zoological Society's Gardens during the past week include two Red Tiger Cats (*Felis planiceps* jv.) from Malacca, a —— Fish Eagle (*Polioaëtus ichthyaëtus*) from the Himalayas, deposited; a Gayal (*Bibos frontalis* ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

OBJECTS FOR THE SPECTROSCOPE.

Sidereal Time at Greenwich at 10 p.m. on March 20 = 9h. 53m. 31s.

Name.	Mag.	Colour.	R.A. 1890.	Decl. 1890.
			h. m. s.	° ′
(1) G.C. 2008	—	—	9 59 44	− 7 11
(2) π Leonis	5	Yellowish-red.	9 54 24	+ 8 34
(3) α Ursæ Majoris ...	2	Yellow.	10 57 0	+62 21
(4) β Ursæ Majoris ...	2	White.	10 55 12	+56 59
(5) D.M. + 68° 617 ...	6	Red.	10 37 26	+67 59
(6) R Virginis	Var.	Red-yellow.	12 32 55	+ 7 35·6
(7) U Boötis	Var.	—	14 49 15	+18 8·6

Remarks.

(1) This nebula is described in the General Catalogue as "Very bright; large; very much extended in a direction 45°; at first very gradually, then very suddenly much brighter in the middle to an extended nucleus." The spectrum of the nebula was observed by Lieut. Herschel in 1868, but his observations are not quite complete. He states that a continuous spectrum was suspected, and that there were probably no lines present. Further observations are obviously required.

(2) A star of Group II. Dunér states that the bands 2–8 are well seen, but that 4 and 5 are somewhat feeble. The spectrum is not strongly marked. The star is probably approaching the temperature at which the bands will be replaced by lines, and affords an opportunity of studying the order of the appearance of the lines.

(3) A star of the solar type (Gothard). The usual differential observations are required.

(4) A star of Group IV. (Gothard). The usual observations are required.

(5) One of the finest examples of stars with spectra of Group VI. Dunér states that the four bright zones and all the bands which he has numbered 1–10 are visible. In this star, band 6 is weaker than the other carbon bands. Band 5 is strong; 1, 2, and 3 are weaker; and 7 and 8 are visible with difficulty.

(6) This variable will reach a maximum on March 28. The period is about 146 days and the magnitudes at maximum and minimum 6·5–7·5 and 10–10·9 respectively (Gore). The spectrum is a remarkable one of the Group II. type, and the great range suggests the possible appearance of bright lines at maximum, as in R Andromedæ, &c., observed by Mr. Espin. Mr. Espin has noticed that in the variables, where F is very bright, the bright lines do not appear until some time *after* the maximum. It is therefore important to continue observations for a considerable period.

(7) No record of the spectrum of this variable appears to have been published. The period is about 176 days. The magnitude at maximum is 9–9·5, and that at minimum 13·5 (Gore). A maximum will be reached about March 23.

A. FOWLER.

THE MÉGUÉIA METEORITE.—This meteorite was observed to fall at Mégueía, in Russia, on June 18, 1889, and a short account of Prof. Simaschko's analysis of it is found in the current number of *L'Astronomie*. It is noted that the meteorite belongs to that remarkable division containing carbon in combination with hydrogen and oxygen. The meteorites of this class are Alais, 1806, Cold Bokkeveldt, 1838, Kaba, 1857, Orgueil, 1864, and Nogoya, 1880. The Méguéia meteorite is covered with a thin (0·5 mm.) crust, is black, partly dull and partly shiny, and somewhat friable. A microscopical examination showed dark grey specks distributed through the black mass, varying in size from a mustard-seed to a hemp-seed. These grey specks have a more or less chondritic structure, and are different in composition from the mass of the meteorite. Besides these chondrules, the greenish, semi-transparent particles of olivine are seen as in almost all other meteorites, whilst nickel-iron is disseminated through the mass in small grains, and occurs in a half-fused state on the crust. Account is also given of white angular scales, much resembling certain fossils, but this is not the first time that the chondrules with their eccentrically radiating crystallization have been mistaken for organisms. Like other carbonaceous meteorites, that of Méguéia has a bituminous smell.

THE VELOCITY OF THE PROPAGATION OF GRAVITATION.—M. J. Van Hepperger, in a paper read before the Vienna Academy of Science, has assigned an inferior limit to the velocity of propagation of gravitation. It results from this limit that the time taken by gravitation to travel the radius of the earth's orbit does not exceed a second.

THE VATICAN OBSERVATORY.—The work to be undertaken at this new Observatory will be in connection with meteorology, terrestrial magnetism, seismology, and astronomy. The astronomical portion will mainly be directed to the photography of the sun and other celestial bodies, and to take part in the construction of the photographic map of the heavens, under the direction of the International Committee.

DOUBLE-STAR OBSERVATIONS.—Mr. S. W. Burnham, of the Lick Observatory, gives his sixteenth catalogue of double-stars in *Astronomische Nachrichten*, Nos. 2956–57. The observations were made in May, June, and July 1889, and 62 new pairs have been discovered and measured during this period.

SUN-SPOT IN HIGH LATITUDES.—The *Comptes rendus* of the Paris Academy of Sciences for March 10 contains a short note by M. G. Dierckx, in which he states that he observed a sun-spot on March 4 in N. lat. 65°. If this were substantiated, it would be an almost unprecedented observation. But the photograph of the sun taken at the Royal Observatory, Greenwich, on that day, shows no trace of a spot in so high a latitude. A fine group did indeed appear on the sun on March 4, but its latitude was only 34°. This, however, is a very interesting circumstance, for though spots have been observed at considerably greater distances from the equator, they have usually been only small, and have lasted but a few hours, or two or three days at most. It would seem probable, therefore, this is the group which M. Dierckx observed, but that he made some error in determining its latitude.

GEOGRAPHICAL NOTES.

THE limits of the ever-frozen soil in Siberia are the subject of a paper by M. Yatchevsky, in the *Izvestia* of the Russian Geographical Society (vol. xxv. 5). It is now generally admitted that Karl Baer's criticism of Middendorff's measurements in the Sherghin shaft at Yakutsk—from which measurements Middendorff concluded that the depth of frozen soil at Yakutsk reaches 600 feet—are well founded. The walls of the shaft, which was pierced seven years before Middendorff came to Yakutsk, had cooled in the meantime through the free access of cold air, and therefore a smaller increment of increase of